



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246

D350-748-103
Job Sheet 191080



Part No: D350-748-103

Job Qty: 1 ea

Part Name: AS350 / AS355 Stainless Steel Fwd Crosstube



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 2/21/19

Job Tracking No:

Due Date: 4/12/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D350-748-143 REV:A IPP Rev:A PRELIM New Issue LL 12.05.08 lpp rev:B DEO ADDED POWDER COAT
JLM VERIFIED BY:JFS

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter / Supplier Lead Time	Sign-off
					Setup Hrs	Run Hrs		
90	Start up Operation	1 Ea	4/12/19	4/12/19	0.00	0.00	Start Up Crosstubes-1	N/R
110	CNC Bend Skid tubes	1 pcs	4/12/19	4/12/19	6.53	3.45	CNC Bend Skid tube	GP/BB 19-08-2019
127	QC	1 pcs	4/12/19	4/12/19	0.00	0.00	QC15	MAY 23 2019 68
128	Crosstubes	1 pcs	4/12/19	4/12/19	0.00	2.49	Crosstubes-2	BB 12-5-14 9-89
130	Crosstubes	1 pcs	4/12/19	4/12/19	0.00	2.49	Crosstubes-2	GP 19-05-2019
140	QC	1 pcs	4/12/19	4/12/19	0.00	0.00	QC5	MAY 30 2019 68
174	Outsource	1 pcs	4/12/19	4/12/19			SKY002-VC	MA 2019-05-30 9-89
176	Packaging	1 pcs	4/12/19	4/12/19	0.00	0.00	Packaging2	JUN 03 2019 S
178	QC	1 pcs	4/12/19	4/12/19	0.00	0.00	QC5	JUN 03 2019 68
180	SprayPaint	1 pcs	4/12/19	4/12/19	0.00	0.99	Spray Paint	AB 19-6-11 9-89
190	QC	1 pcs	4/12/19	4/12/19	0.00	0.00	QC14	JUN 24 2019 68
193	Outsource - 11 - Paint	1 pcs	4/12/19	4/12/19			ATE003-VC 5	N/R 9-89
195	Packaging 2-1 - Receive - B4B	1 pcs	4/12/19	4/12/19	0.00	0.00	Packaging 2 - 1 - B4B	
							Packaging 2 - 2 - B4B	
							Packaging 2 - 3 - B4B	
							Packaging 2 - 5 - B4B	
							Packaging 2 - 4 - B4B	
							Packaging 2 - 6 - B4B	
							Packaging 2 - 7 - B4B	
							Packaging 2 - 8 - B4B	
							Packaging 2 - 9 - B4B	
							Packaging 2 - 10 - B4B	
							Packaging 2 - 11 - B4B	
							Packaging 2 - 12 - B4B	
							Packaging 2 - 13 - B4B	
							Packaging 2 - 14 - B4B	
							Packaging 2 - 15 - B4B	
							Packaging 2 - 16 - B4B	
							Packaging 2 - 17 - B4B	
							Packaging 2 - 18 - B4B	

Plex 2/21/19 9:23 AM Dart.lajeunesse.marie



Dart Aerospace Ltd.
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Hawkesbury, ON K64 1K7
CANADA
TEL.: 1 613 632-5200
Email: sales@dartaero.com
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Container No: S183002



Part: D350-748-103

Job No: 191080

Serial No/Batch: S183002

Revision: A

Inspector:

Exp Date:

Instructions: TC STC SH06-27 Issue 2, FAA STC SR02359NY 11/03/04, EASA S

				Packaging 2 - 19 - B4B	
				Packaging 2 - 20 - B4B	
				Packaging 2 - 21 - B4B	
				Packaging 2 - 22 - B4B	
				Packaging 2 - 23 - B4B	
				Packaging 2 - 24 - B4B	
				Packaging 2 - 25 - B4B	
				Packaging 2 - 26 - B4B	
				Packaging 2 - 27 - B4B	
				Packaging 2 - 28 - B4B	
				Packaging 2 - 29 - B4B	
				Packaging 2 - 30 - B4B	
				Packaging 2 - 31 - B4B	
				Packaging 2 - 32 - B4B	
				Packaging 2 - 33 - B4B	
				Packaging 2 - 34 - B4B	
				Packaging 2 - 35 - B4B	
197 QC 6	1 pcs	4/12/19	0.00 0.00	QC 6 - 42	
				QC 6 - 9	
				QC 6 - 68	
				QC 6 - 61	
200 Crosstubes	1 pcs	4/12/19	0.00 2.49	Crosstubes-2	RD 19-6-23
210 QC	1 pcs	4/12/19	0.00 0.00	QC5	JUN 24 2019
220 Packaging	1 pcs	4/12/19	0.00 0.00	Packaging1-3	DAS 39
230 QC	1 pcs	4/12/19	0.00 0.00	QC4	DAS 58
240 Packaging	1 pcs	4/12/19	0.00 0.00	Packaging3-1	DAS 21 9-89
245 DC	1 pcs	4/12/19	0.00 0.00	DC	JUL 04 2019
250 QC21-FG	1 Ea	4/12/19	0.00 0.00	QC21	JUL 04 2019

Part Op 110 - Bend tube as per Dwg D350-748-143 using CNC bender program D350F and Folio FT-89 *****VERIFY
 Descriptions: CROSSTUBE DIMENSIONS AS PER DWG*****UNDER BEND .225" PER SIDE*****USE (4) DT9824 SHIM BLOC
 TO CHECK STRAIGHTNESS****

127 - ***MARK CUT LINES***

128 - CUT TUBE AT HEIGHT ON FAI SHEET VERF HEIGHT _____ BY QC 15 LEVEL INSPECTOR _____
 VERF TWIST 0.057 BY QC15 LEVEL INSPECTOR _____

130 - 1- Drill Tube as per Dwg D350-748-143 Using DT8876 A,B & C Drill Jigs, set-up drill table as per QSI 010 2- Deburr
 3- Engrave Part # and Batch # as per Dwg D350-748-143 4- Remove all marks from tube within limits of D350-748-143

140 - CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

174 - ISSUE P/O TO SKY SERVICE:

180 - ***VERIFY BY _____ BATCH # TO MATCH W/O _____ ***MASK SCRIBE B# & P# AND
 VERIFY*** 1. Apply Axalta 13205S Cleaner inside and outside crosstube per QSI 005 4.1.4 BATCH: _____

LIMIT AIR PRESSURE TO 50 PSI WHEN INSTALLING AETC-1032 INSERT AND ONLY EXPAND INSERT ONCE

2. Axalta 230S Metalok inside and outside crosstube per QSI 005 4.1.4 BATCH: _____ 3. Prime inside and outside
 crosstube per QSI 005 4.2 BATCH: _____ 4. Paint outside of crosstube per QSI 005 4.2 BATCH: _____

190 - Then, Wrap in plastic bag to protect from scratches ***VERIFY BY _____ BATCH # TO MATCH W/O

193 - ISSUE P/O: _____ 1. Apply Axalta 13205S Cleaner inside and outside crosstube per QSI 005
 4.1.4 BATCH: 138949 2. Axalta 230S Metalok inside and outside crosstube per QSI 005 4.1.4 BATCH: 138021

3. Prime inside and outside crosstube per QSI 005 4.2 BATCH: 5154137 4. Paint outside of crosstube per QSI 005 4.2
 BATCH: 518835 C OF C IS REQUIRED

200 - INSTALL GROUND WIRE INSERT, THEN INSERT SCREW AND WASHER 1-Abraide mating surfaces of support
 and crosstube with 180 grit sandpaper, clean the area with MEK or equivalent as per dwg 2-Install supports with Proseal
 890 per D350-748-143 and QSI 015 A/R Proseal 890 Batch: 5176610 EXP: 19-10 3-Install supports
 clamps Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS. PROSEAL CURE TIME 72 HOURS:

Start: 19-6-22 Finish: 19-6-25 ***RE-CHECK TORQUE ON CLAMP AFTER
 PROSEAL HAS CURED FOR 72HOURS AS PER DWG.***

210 - ***RE-CHECK TORQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 72HOURS AS PER DWG.***

***VERIFY BY _____ BATCH # TO MATCH W/O _____

230 - ***VERIFY BY _____ BATCH # TO MATCH W/O _____

240 - Identify and pack for shipping as per PPP D350-748-103 Location: FG103 PPP Rev: fg103

245 - Photocopy bluefile & type labels per PPPD350-748-103 CHG001

010649

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D350-748-143TRN	Ss Crosstube Turning Detail	1 pcs (1 ea)	90-Start up Operation	5170268
AETC-1032	Insert	1 Ea (1 ea)	200-Crosstubes	
D3502-1	Support	2 Ea (2 ea)	200-Crosstubes	
D5123-7	Clamp Cushion	2 pcs (2 ea)	200-Crosstubes	
MS21920-20	Clamp	2 Ea (2 ea)	200-Crosstubes	
MS51958-63	Screw	1 pcs (1 ea)	200-Crosstubes	
NAS1149C0363R	Washer	1 Ea (1 ea)	200-Crosstubes	
AN4-41A	Bolt	8 Ea (8 ea)	220-Packaging	5058981-1
AN4-6A	Bolt	16 Ea (16 ea)	220-Packaging	5163234
AN5-32A	Bolt	4 Ea (4 ea)	220-Packaging	5058983
D3500-1	Saddle	4 pcs (4 ea)	220-Packaging	5133673
D3501-1	Bushing	16 pcs (16 ea)	220-Packaging	5179115
MS21042L4	Nut	24 Ea (24 ea)	220-Packaging	5157064
MS21042L5	Nut	4 Ea (4 ea)	220-Packaging	5181786
NAS1149D0463J	Washer	32 Ea (32 ea)	220-Packaging	5174671
NAS1149D0563J	Washer	8 Ea (8 ea)	220-Packaging	5174288

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation	D350-748-143TRN	1	0	0
200-Crosstubes	AETC-1032	① FM 107375	19	0
	D3502-1	② SI 33464	0	0
	D5123-7	② FI 63264	255	0
	MS21920-20	② SI 03843	111	0
	MS51958-63	1	46	0
	NAS1149C0363R	1	628	0
220-Packaging	AN4-41A	8	337	0
	AN4-6A	16	653	0
	AN5-32A	4	409	0
	D3500-1	4	59	0
	D3501-1	16	241	0
	MS21042L4	24	2,375	0
	MS21042L5	4	777	0
	NAS1149D0463J	32	3,271	0
	NAS1149D0563J	8	1,320	0

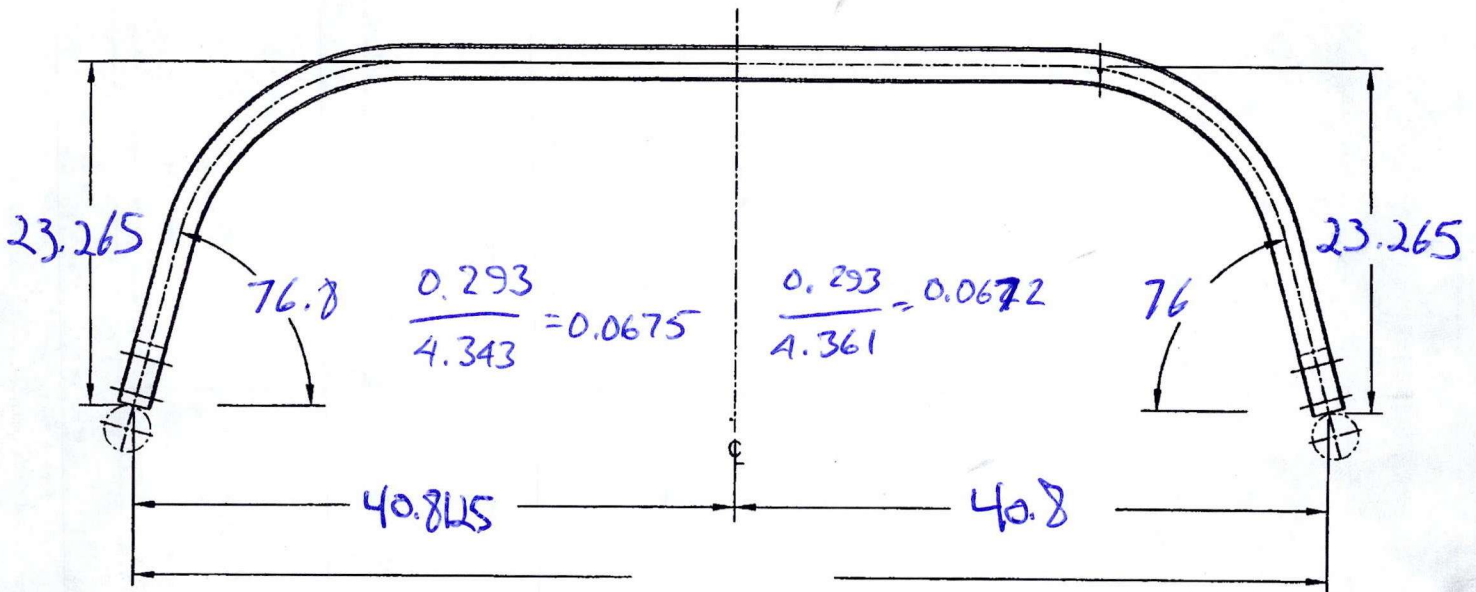
Part Specifications

Specifications could not be found.

Plex 2/21/19 9:23 AM Dart.lajeunesse.marie

DART AEROSPACE LTD		Work Order:	1910 80
Description: Crosstube High Fwd, SS (AS350/355)		Part Number:	D350-748-103
Inspection Dwg: D350-748-143 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	23.00	23.50
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.55	82.05
Bending Passes	7	--
Crushing	--	8%
Twist	--	0.38



	Side A	Side B
Bending Passes		
Crushing	6.7%	6.7%
Comments		

$\frac{2.025}{2.318}$

$\frac{2.054}{2.307}$

QC15 Inspection	DAS
Date	68 MAY 23 2019 9:39

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue	KJ	AA

Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐																															
Date :		Sequence #:		QTY Affected :		MRB (QSI042)																													
Description Work Order Deviation				Disposition																															
				Completed By																															
				Lead hand / Supervisor																															
				QC / QA Coordinator																															
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY <table border="0"><tr><td>☐ Pressure/Forced</td><td>☐ Contamination</td><td>☐ Power Loss/Surge</td><td>☐ Positioned Wrong</td></tr><tr><td>☐ Bending</td><td>☐ Misaligned/off center</td><td>☐ Folio/Program</td><td>☐ Outside Tolerance</td></tr><tr><td>☐ Crushing</td><td>☐ BOM/Route</td><td>☐ Grain Direction</td><td>☐ Drawing</td></tr><tr><td>☐ Cracks</td><td>☐ Broken/Damage/Defect</td><td>☐ Weld</td><td>☐ Finish</td></tr><tr><td>☐ Crimp/Kink/Ripple/Wave/Twist</td><td>☐ Incomplete/Unclear Instructions</td><td>☐ Wrong Stock Pulled</td><td>☐ Part Lost/Missing</td></tr><tr><td>☐ Marks/Chatter</td><td>☐ Drill Holes</td><td>☐ Out of Sequence</td><td>☐ Misread</td></tr><tr><td>☐ Mislabeled</td><td>☐ Fit/Function</td><td>☐ Off-set/Set-up</td><td></td></tr></table>						☐ Pressure/Forced	☐ Contamination	☐ Power Loss/Surge	☐ Positioned Wrong	☐ Bending	☐ Misaligned/off center	☐ Folio/Program	☐ Outside Tolerance	☐ Crushing	☐ BOM/Route	☐ Grain Direction	☐ Drawing	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Finish	☐ Crimp/Kink/Ripple/Wave/Twist	☐ Incomplete/Unclear Instructions	☐ Wrong Stock Pulled	☐ Part Lost/Missing	☐ Marks/Chatter	☐ Drill Holes	☐ Out of Sequence	☐ Misread	☐ Mislabeled	☐ Fit/Function	☐ Off-set/Set-up	
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☐ Mislabeled	☐ Fit/Function	☐ Off-set/Set-up																																	
Other/Details:																																			

Item	Qty -143	Part Number	Description
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	1	D6021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
6	1	NAS1149C0363R	WASHER (OR AN960C10)
7	1	NAS1635-3-8	SCREW (OR MS51958-63)
8	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125 (17-4PH)
FINISHED LENGTH AFTER TURNING = 112.270±0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-143" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 60 TO 80 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. 19108045
1902-21

UNDER REVIEW

Q1 15/11/24
CRF 15-547 9/2/24

DEO ATTACHED

RELEASED

2015 MAR 18

4/EN 15-547

A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA		REV. A SHEET 1 OF 4	
DRAWING NO. D350-748-143		SCALE	
TITLE CROSSTUBE (AS 350/355 HI FWD)		NTS	
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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐	DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐			
Date :	Sequence #:	QTY Affected :		MRB (QS1042)	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor	
Root Cause		FAULT CATEGORY			
Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		☐ Pressure/Forced	☐ Contamination	☐ Power Loss/Surge	☐ Positioned Wrong
		☐ Bending	☐ Misaligned/off center	☐ Folio/Program	☐ Outside Tolerance
		☐ Crushing	☐ BOM/Route	☐ Grain Direction	☐ Drawing
		☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Finish
		☐ Crimp/Kink/Ripple/Wave/Twist	☐ Incomplete/Unclear Instructions	☐ Wrong Stock Pulled	☐ Part Lost/Missing
		☐ Marks/Chatter	☐ Drill Holes	☐ Out of Sequence	☐ Misread
		☐ Mislabeled	☐ Fit/Function	☐ Off-set/Set-up	
		Other/Details:			

8 7 6 5 4 3 2 1

D

C

B

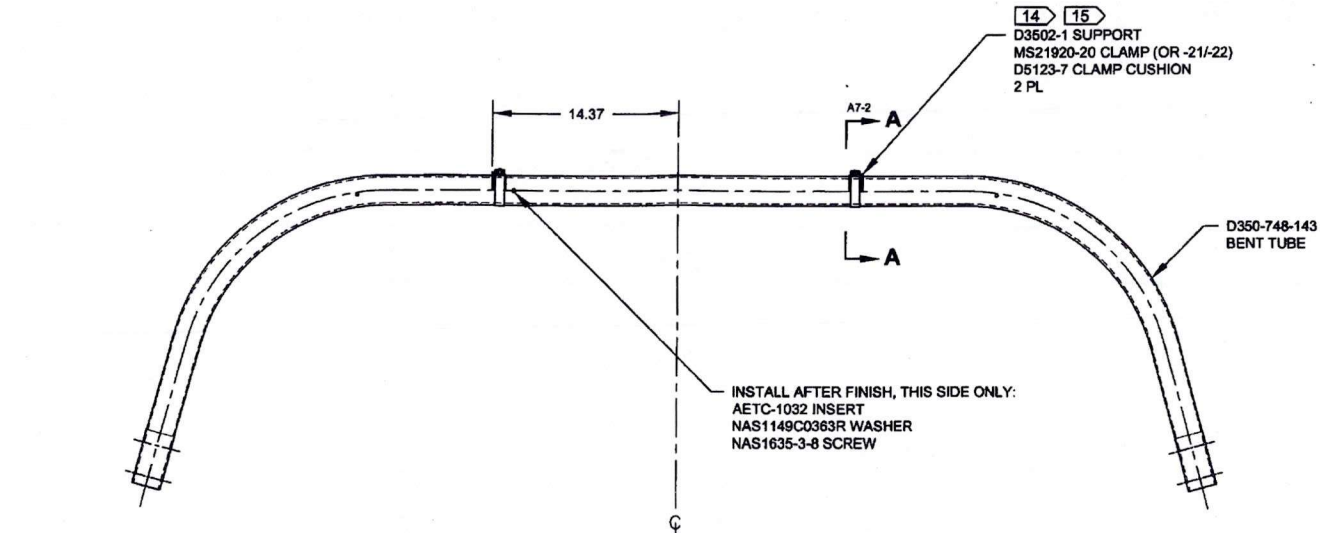
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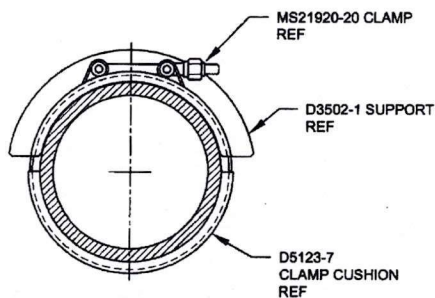
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B

A



**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

DEO ATTACHED

RELEASED

2015 MAR. 18
47 ECW-15-547

UNDER REVIEW

4/15/12.3
9/12/12

DESIGN	47	DART AEROSPACE LTD	
DRAWN	47	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	[Signature]	D350-748-143	SHEET 2 OF 4
APPROVED	[Signature]	TITLE	SCALE
DE APPR.	[Signature]	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2016 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1

Entered: _____ Date: _____

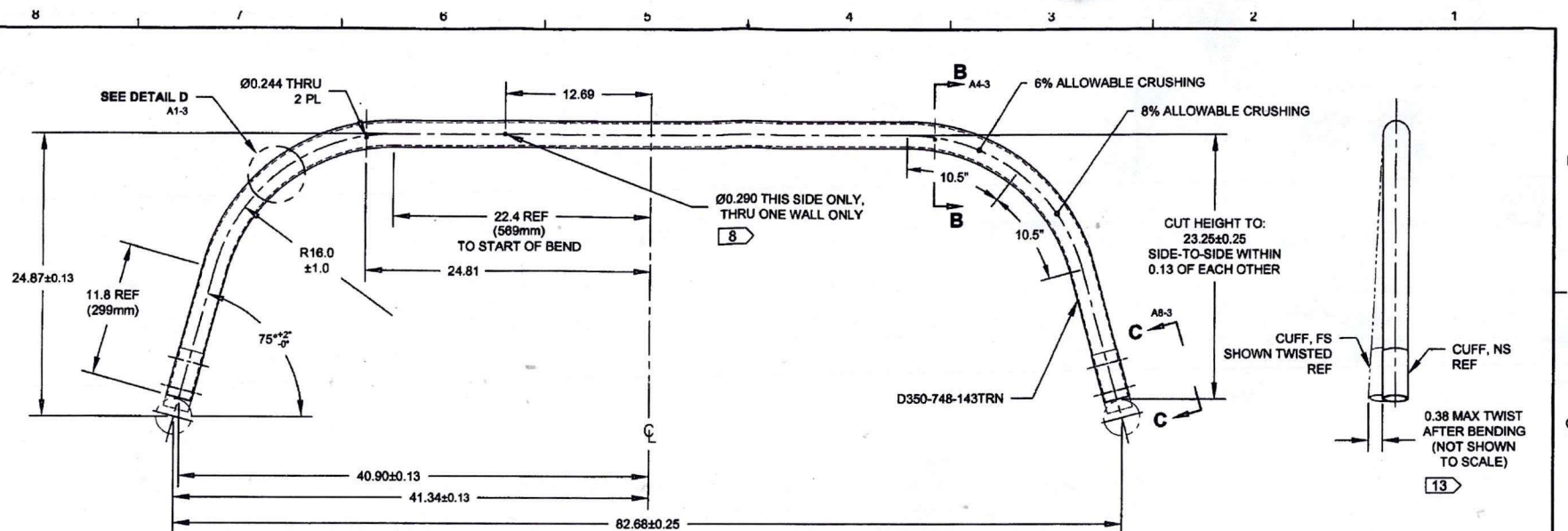


WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

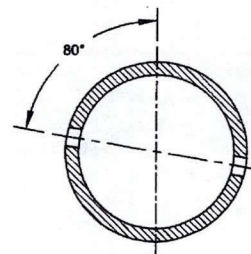
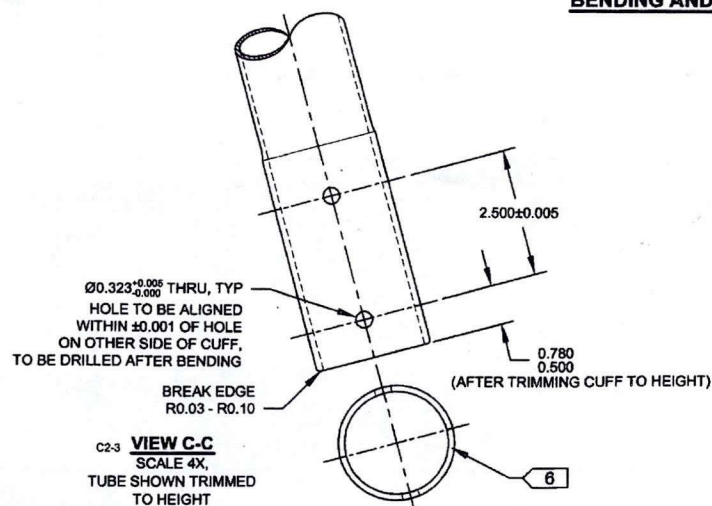
NCR No. _____

Route update only ☐

Job: _____ Part No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐			
Date : _____		Sequence #: _____		QTY Affected : _____		MRB (QS1042)	
Description Work Order Deviation				Disposition			
				Completed By			
				Lead hand / Supervisor			
				QC / QA Coordinator			
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread					
		Other/Details:					



D350-748-143
BENDING AND DRILLING DETAIL 11



SECTION B-B D3-3
SCALE 6X

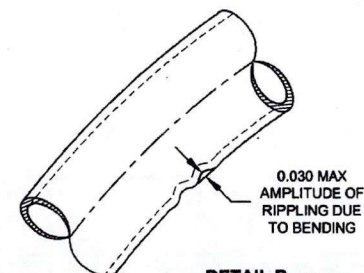
RELEASED

2015 MAR 18

DEO ATTACHED

UNDER REVIEW

15/4/28
9/4/29



DETAIL D D7-3
SCALE 4X
RIPPLING EXAGGERATED

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

Entered: _____ Date: _____

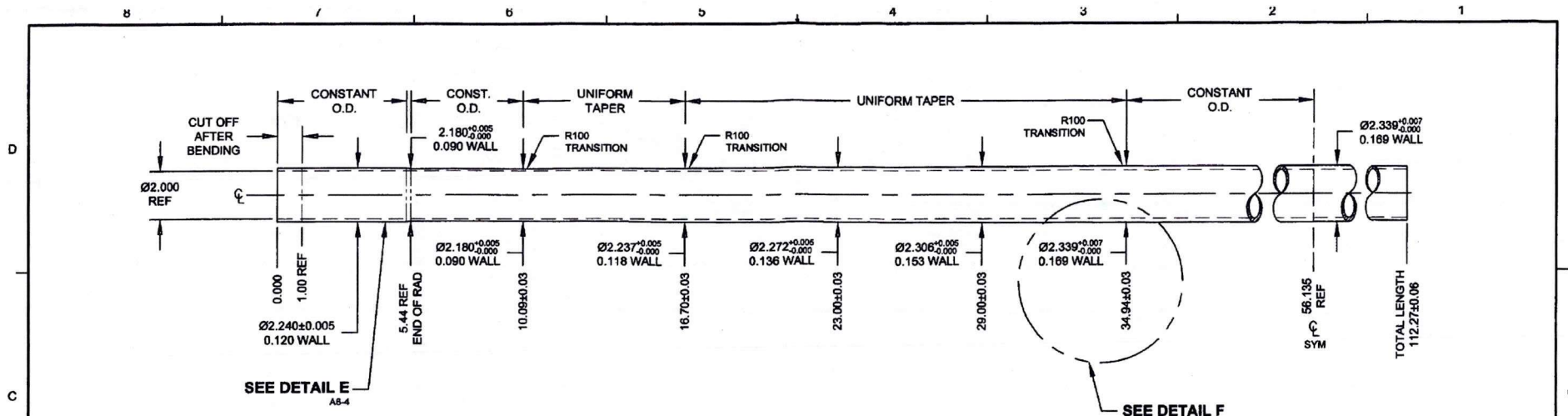


WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

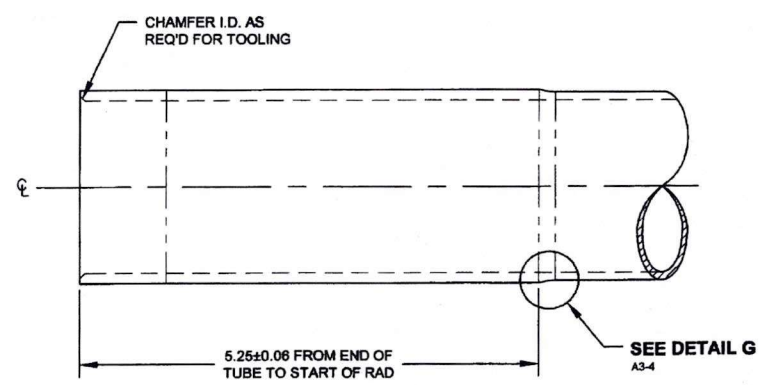
Route update only ☐

Job: _____ Part No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐			
Date : _____		Sequence #: _____		QTY Affected : _____		MRB (QSI042)	
Description Work Order Deviation				Disposition			
				Completed By			
				Lead hand / Supervisor			
				QC / QA Coordinator			
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread					
		Other/Details: _____					

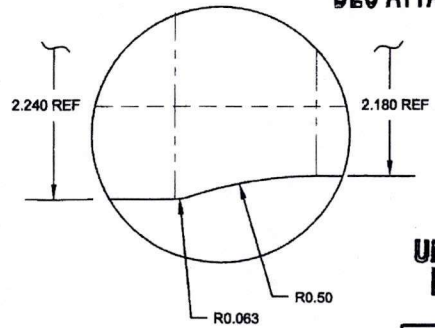


**D350-748-143TRN
TURNING DETAIL**

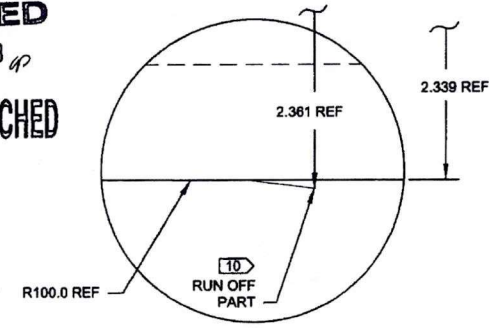
RELEASED
 2015 MAR 18
 DEO ATTACHED



**DETAIL E:
CROSSTUBE CUFF** C7-4
 SCALE 3X



**DETAIL G:
CUFF TRANSITION** A5-4
 NOT TO SCALE



**DETAIL F:
TOOL RUN-OFF** C3-4
 NOT TO SCALE

UNDER REVIEW
 15/1/26

DESIGN	AP	DART AEROSPACE LTD	
DRAWN	AP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	AP	DRAWING NO.	REV. A
MFG. APPR.	AP	D350-748-143	SHEET 4 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	AP	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD	
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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐			
Date : _____		Sequence #: _____		QTY Affected : _____		MRB (QS1042)	
Description Work Order Deviation				Disposition			
				Completed By			
				Lead hand / Supervisor			
				QC / QA Coordinator			
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread					
		Other/Details:					

DRAWING NO. D350-748-143	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-143-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>		DE APPR. <i>[Signature]</i>		
DATE 15.11.18	DATE 15.11.18	DATE 16.02.19	DATE FEB 19 2016		DATE 2016.02.19		

AMEND NOTE 2 (SHEET 1) AS FOLLOWS:

- 2) FINISH: PREPARE SURFACE PER DART QSI 005 4.1.4
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
 OR
 POWDER COAT WHITE (4.3.5.2) PER DART QSI 005 4.3

RELEASED
 2016-02-26

ECN 16-534

[Signature]

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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐																															
Date : _____		Sequence #: _____		QTY Affected : _____		MRB (QS1042)																													
Description Work Order Deviation				Disposition																															
				Completed By																															
				Lead hand / Supervisor																															
				QC / QA Coordinator																															
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY <table border="0"><tr><td>☐ Pressure/Forced</td><td>☐ Contamination</td><td>☐ Power Loss/Surge</td><td>☐ Positioned Wrong</td></tr><tr><td>☐ Bending</td><td>☐ Misaligned/off center</td><td>☐ Folio/Program</td><td>☐ Outside Tolerance</td></tr><tr><td>☐ Crushing</td><td>☐ BOM/Route</td><td>☐ Grain Direction</td><td>☐ Drawing</td></tr><tr><td>☐ Cracks</td><td>☐ Broken/Damage/Defect</td><td>☐ Weld</td><td>☐ Finish</td></tr><tr><td>☐ Crimp/Kink/Ripple/Wave/Twist</td><td>☐ Incomplete/Unclear Instructions</td><td>☐ Wrong Stock Pulled</td><td>☐ Part Lost/Missing</td></tr><tr><td>☐ Marks/Chatter</td><td>☐ Drill Holes</td><td>☐ Out of Sequence</td><td>☐ Misread</td></tr><tr><td>☐ Mislabeled</td><td>☐ Fit/Function</td><td>☐ Off-set/Set-up</td><td></td></tr></table>						☐ Pressure/Forced	☐ Contamination	☐ Power Loss/Surge	☐ Positioned Wrong	☐ Bending	☐ Misaligned/off center	☐ Folio/Program	☐ Outside Tolerance	☐ Crushing	☐ BOM/Route	☐ Grain Direction	☐ Drawing	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Finish	☐ Crimp/Kink/Ripple/Wave/Twist	☐ Incomplete/Unclear Instructions	☐ Wrong Stock Pulled	☐ Part Lost/Missing	☐ Marks/Chatter	☐ Drill Holes	☐ Out of Sequence	☐ Misread	☐ Mislabeled	☐ Fit/Function	☐ Off-set/Set-up	
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		Other/Details:																																	



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER

POHB043592



Supplier: SKY002-VC
Skyservice
6120 Midfield Road
Mississauga
ON
L5P 1B1 Canada
Phone: 905-678-5636
Fax: 905-678-5841

Attention: Jenne, Heather

Ship To: 1270 Aberdeen Street
Hawkesbury
ON
K6A 1K7 Canada
Phone: 613-632-5200

PO No: POHB043592

PO Date: 5/30/19

Due Date: 5/30/19

**Purchase Order
Revision:**

Revision Date:

Ship-To Contact: Phone:

Via: Ground

Pymt Terms: Net 30

Freight Terms:

Special Comments:

Items

Line Item	Job	Part	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	194991	D212-664-101	Fwd Crosstube - High : TC STC SH01-9 Issue 3, FAA STC SR01298NY 09/01/08, EASA STC EASA.IM.R.S.01304 07/03/06, DGAC MEXICO STC IA-316/2015 15/06/17 *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Liquid Penetrant Inspection as per QSI 038 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	194988		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	194989		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	194990		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
Sub Total:							4	0	4		\$460.00

2	191000	D350-748-103	AS350 / AS355 Stainless Steel Fwd Crosstube : TC STC SH06-27 Issue 2, FAA STC SR02359NY 11/03/04, EASA STC EASA.10016903 Revision 2 10/09/03, BRAZIL 2009S04-04 09/04/06 ISSUE P/O TO SKY SERVICE:	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	191080		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	190999		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	191081		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
Sub Total:							4	0	4		\$460.00



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER

POHB043592



Items

Line Item	Job	Part	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
3	193226	D350-748-203	AS350 / AS355 Stainless Steel Aft Crosstube : TC STC SH06-27 Issue 2, FAA STC SR02359NY 11/03/04, EASA STC EASA.10016903 Revision 2 10/09/03, BRAZIL 2009S04-04 09/04/06 ISSUE P/O TO SKY SERVICE:	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	191001		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
	191002		1X JUN 03 2019	Firmed	-	5/30/19	1 pcs	0 pcs	1 pcs	\$115.00/pcs	\$115.00
Sub Total:							3	0	3		\$345.00

Grand Total: \$1,265.00

Order Notes

Procurement Quality Clauses
A005 right of entry
A012 chemical and physical test report
A016 personnel qualification
A017 raw material identification (as applicable)

A022 Apical Processing
A024 process certifications
A026 certification of material conformance

A041 quality management system
A042 dart notification by supplier
A043 retention of quality documents

A048 counterfeit parts avoidance, detection, mitigation and disposition program

A049 supplier awareness

Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Handwritten signature and date: 03-06-19

Plex 6/3/19 8:15 AM Dart.Guerin.Kimberley

**skyservice****Work Order Traveler**
Sky Service F.B.O. Inc.

10105 Ryan Avenue, Dorval, Quebec, H9P 1A2

TCCA AMO 53-89 / EASA 145 7142 / BDA AMO 385

WO #: MWO40600	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: POHB043592 ✓
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:**CARRY OUT NDT INSPECTION (LIQUID PENETRANT) ON 11 CROSSTUBES**

ITEM ID: D350-748-203 AS350/AS355 STAINLESS STEEL AFT CROSSTUBE

1 - WORK ORDER ID#: 191002 ✓

2 - WORK ORDER ID#: 191001 ✓

3 - WORK ORDER ID#: 193226 ✓

ITEM ID: D350-748-103 AS350/AS355 STAINLESS STEEL FWD CROSSTUBE

4 - WORK ORDER ID#: 190999 ✓

5 - WORK ORDER ID#: 191081 ✓

6 - WORK ORDER ID#: 191000 ✓ **DAS**7 - WORK ORDER ID#: 191080 ✓ **68**
9-89

ITEM ID: D212-664-101 FWD CROSSTUBE - HGH

8 - WORK ORDER ID#: 194991 ✓

9 - WORK ORDER ID#: 194990 ✓

10 - WORK ORDER ID#: 194989 ✓

11 - WORK ORDER ID#: 194988 ✓

RECEIVED

JUN 03 2019

DART AEROSPACE LTD.

Action Taken:		Date:	Initial/Stamp:		
LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-11) AS PER ASTM1417M-16		30 MAY 2019	 ✓		
NO CRACK FOUND					
PEN ZL-37, MPO23206, CLEANER SKC-S MPO15030, EMU. MPO15896, DEV. MPO23451, UV LIGHT M-20142					
Description	Location P/N	Qty	Batch	S/N Off	S/N On
- NIP -					

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:		ACA/SCA Stamp 	Date:
Name:	ANTONINO MARCHETTA		

4.0 WEIGHT AND BALANCE

The following weight and balance information is for Dart crosstube installations only. This data should be similar to the existing installation. Differences from the parts removed are the responsibility of the installer.

DART CROSSTUBE	FWD/ AFT	WEIGHT	STA	MOMENT
D350-748-101 D350-748-103	Fwd	35.2 lb (16.0 kg)	106.3 in (2.70 m)	3742 lb-in (43.2 kg-m)
D350-748-201 D350-748-203	Aft	34.7 lb (15.7 kg)	162.4 in (4.12 m)	5635 lb-in (64.7 kg-m)

5.0 PARTS LIST

Qty -101	Qty -103	Qty -201	Qty -203	Part Number	Description
X				D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X			D350-748-103	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD (SS)
		X		D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
			X	D350-748-203	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT (SS)
1				D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1			D350-748-143	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD (SS)
		1		D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
			1	D350-748-243	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT (SS)
*2	*2	*2	*2	D3502-1	SUPPORT
*2	*2	*2	*2	D5123-7	CLAMP CUSHION
*1		*1		AELS-1032-225	INSERT
	*1		*1	AETC-1032	INSERT
*2	*2	*2	*2	MS21920-20	CLAMP (OR MS21920-21/-22)
*1		*1		MS27039-1-10	SCREW
	*1		*1	NAS1685-3-8	SCREW (OR MS51958-63)
*1		*1		NAS1149D0363J	WASHER (OR AN960JD10)
	*1		*1	NAS1149C0363R	WASHER (OR AN960C10)
4	4	4	4	D3500-1	SADDLE
16	16	16	16	D3501-1	BUSHING
16	16	16	16	AN4-6A	BOLT
8	8	8	8	AN4-41A	BOLT
4	4	4	4	AN5-32A	BOLT
32	32	32	32	NAS1149D0463J	WASHER (OR AN960JD416)
8	8	8	8	NAS1149D0563J	WASHER (OR AN960JD516)
24	24	24	24	MS21042L4	NUT (OR MS21042-4)
4	4	4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/-143/-241/-243 ASSEMBLIES ABOVE

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Revision: **C**

Date: 15.02.25